An improved digital global map of spectral parameters of Vesta from the Visible and Infrared mapping Spectrometer onboard Dawn

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The NASA/Dawn discovery mission has been designed to study in detail two of the largest proto-planets of the asteroid belt: Vesta and Ceres. From July 2011 to September 2012, Dawn has been orbiting around Vesta and the instruments have returned scientific data from three different orbital altitudes: the survey, the high altitude, and the low altitude mapping orbits. From these orbits, Dawn's Visible and Infrared mapping Spectrometer (VIR) acquired infrared and visible spectra from 0.2 to 5 microns, sampled in 864 channels with a spatial resolution reaching about 150 m/pixel.

VIR spectra of Vesta have been analyzed to derive spectral parameters, which synthesize specific characteristics of the single spectra and are diagnostic of the mineralogical composition and the physical state of the portion of surface being observed. In particular, we focus on spectral parameters related to the 1.0- and 2.0-micron bands (band I and band II) typical of pyroxenes. In general, a shift in band center suggests a change in composition while the change in band depths are diagnostic of a change in the physical state of the material. Combined analysis of spectral parameters leads towards specific studies, as for example the detection of a specific mineral assemblage.

Since the acquisition of first VIR data, we have worked in gathering into maps the spectral parameters extracted from every single spectrum, resulting in a global view of the mineralogical diversity of the surface of Vesta. The maps are being produced in the same projection as the camera mosaics, enabling to observe and analyze the spatial correlation between mineralogy and morphology.

Here we present the global maps of spectral parameters of Vesta, improved from the previously presented ones. Filtering has been applied to input data, on the base of experience acquired during the mission. The resulting maps are more consistent, and the coverage has not been affected (practically) by the filtering process applied.

The digital maps are being produced in several digital formats, allowing both the spectroscopists and non-spectroscopists to work on the same data using the software tools they are more familiar with. In particular, among other formats, the digital maps are produced in a Geographic Information System (GIS) -compatible digital format, so they can be used together with other digital maps as image mosaics, topography and geologic maps, introducing interesting perspectives for the scientific investigation of the proto-planet Vesta.

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